WE CLAIM:

1. A diagnostic system for ozone-splitting catalytic converters comprising:

a catalytic element in contact with a gas flow,

a plurality of heated conductivity sensors for the detection of ozone, wherein at least a first ozone sensor is arranged in the gas flow upstream of the catalytic element and at least a second ozone sensor is downstream thereof, and

further comprising monitoring means to monitor the functioning of the catalytic element by comparing the ozone concentrations upstream and downstream of said element.

2. The diagnostic system according to claim 1, wherein the ozone sensors have an operating temperature in the range of about 500 to about 750°C.

3. The diagnostic system according to claim 1, wherein the conductivity sensors comprise a gas-sensitive layer of gallium oxide (Ga_2O_3).

4. The diagnostic system according to claim 3, wherein the conductivity sensor comprises a further layer comprising indium oxide (In_2O_3) on at least a portion of the layer of gallium oxide.

5. The diagnostic system according to claim 1, wherein the catalytic element is a motor vehicle radiator.

6. The diagnostic system according to claim 1, wherein the ozone sensors are each arranged in a housing having a gas-permeable inlet membrane.

7. The diagnostic system according to claim 6, wherein the membrane is an open, porous, hydrophobic polymer membrane comprised of a material selected from the group consisting of polytetrafluoroethylene, polyethylene or polypropylene.

8. The diagnostic system according to claim 6, wherein the membrane is comprised of a fiber material.

9. The diagnostic system according to claim 6, wherein a plurality of inlet membranes are connected in series.

10. The diagnostic system according to claim 1, further comprising evaluation electronics, and the sensor elements together with evaluation electronics are in a common housing.

11. The diagnostic system according to claim 1, wherein sensor data is transmitted to an engine management system.

12. A method of operating the diagnostic system in accordance with claim 1, comprising maintaining the ozone sensors at the same operating temperatures during a measurement.

13. A method according to claim 12, wherein a measuring process is divided into two stages, the ozone sensors in a first stage being kept at the same operating temperatures, and at least one operating temperature on at least one of the ozone sensors being adjusted in a second stage.

14. The method according to claim 13, wherein in the second stage of the measuring process the operating temperatures of the two ozone sensors are equal.

15. The method according to claims 12 and 13, wherein prior to a measurement it is determined by evaluation of the signal from a first ozone sensor, whether an adequate ozone concentration and an adequate gas flow are present for an appropriate conversion measurement.

16. The method according to claim 15, wherein the temperature on the catalytic element is taken into account in making the determination.

17. The method according to claim 12, wherein in each measurement a differential signal from the ozone sensors is evaluated.

18. The method according to claim 13, wherein the operating temperature is reduced in order to reduce in the second stage transverse axis sensitivities.

19. The method according to claim 12, wherein the operating temperature of the sensors is in a range between about 500°C and about 750°C.

20. The method according to claim 12, further comprising balancing the sensors' characteristics with one another.

21. The method according to claim 12, further comprising controlling of operation as claimed in one of the preceding claims, in the heating of the ozone sensors.

22. The method according to claim 19, wherein the operating temperature is about 650°C.

23. The method according to claim 1, comprising maintaining the ozone sensors at different operating temperatures during a measurement.

24. The method according to claim 23, wherein a measuring process is divided into two stages, the ozone sensors in a first stage being kept at different operating temperatures, and at least one operating temperature on at least one ozone sensor being adjusted in a second stage.

25. The method according to claim 24, wherein the operating temperatures of the ozone sensors are equal in the second stage.

26. The method according to claims 23 and 24, wherein prior to a measurement it is determined by evaluation of the signal from a first ozone sensor, whether adequate ozone concentration and an adequate gas flow are present for an appropriate conversion measurement.

27. The method according to claim 26, wherein the temperature of the catalytic element is taken into account in making the determination.

28. The method according to claim 23, wherein in each measurement a differential signal from the ozone sensors is evaluated.

29. The method according to claim 25, wherein the operating temperature is reduced in the second stage in order to reduce transverse axis sensitivities.

30. The method according to claim 23, wherein the operating temperature of the sensor is in a range between about 500°C and about 750°C.

31. The method according to claim 30, wherein the temperature is about 650°C.

32. The method according to claim 23, further comprising balancing the sensors' characteristics with one another.

33. The method according to claim 23, further comprising controlling the heating of the ozone sensors.